

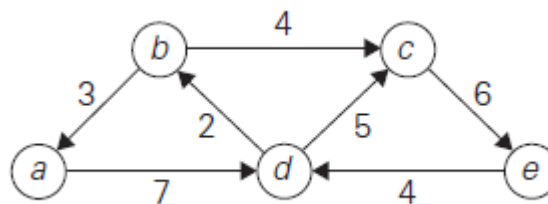
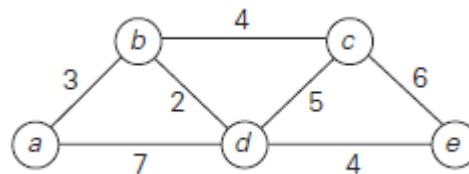
DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

1. Explain Greedy Criterion with the help of change making problem. Write a prim's algorithm to find minimum cost spanning tree.
2. Sort the given list of numbers using Heap sort 2,9,7,6,5,8.
3. Design an algorithm to find single source shortest path.
4. Construct a Huffman Tree and Resulting code word for the following

Character	A	B	C	D	—
Probability	0.35	0.1	0.2	0.2	0.15

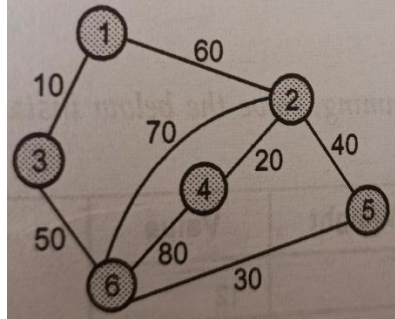
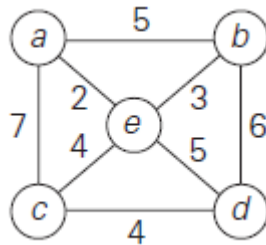
Encode the words DAD and ADD

5. Solve the Greedy Knapsack Problem where $m=10$, $n=4$, $\{p_1, p_2, p_3, p_4\} = \{40, 42, 25, 12\}$
 $\{w_1, w_2, w_3, w_4\} = \{4, 7, 5, 3\}$.
6. What is Job Sequencing with Deadlines Problem? Let $n=5$, Profits $\{10, 3, 33, 11, 40\}$ and deadlines $\{3, 1, 1, 2, 2\}$ respectively. Find the optimal solution using greedy algorithm.
7. Design Dijkstra's algorithm and apply the same to find the single source shortest path for the following graphs vertex 'a' as source.

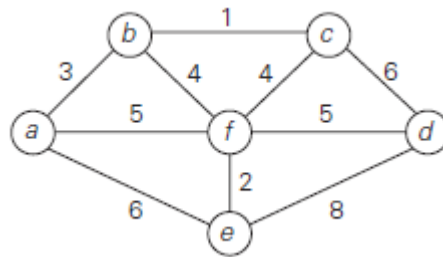


8. Explain transform and conquer technique with suitable example.
9. Define Heap write bottom up heap construction algorithm. Construct heap for the list 1, 8, 6, 5, 3, 7, 4 using bottom up algorithm and successive key insertion method.

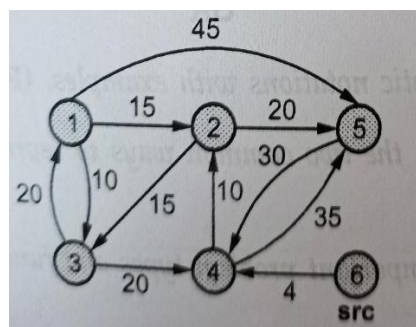
10. Apply prim's algorithm and Kurskal's method to find the minimum cost spanning tree to the following graphs.



11. Design algorithm to construct the minimum cost spanning tree using kruskal's algorithm and apply the same for the following graph.



12. Solve the following instance of the single source shortest path problem with vertex '6' as the source.



13. Construct a Huffman code for the following data

Character	A	B	C	D	—
Probability	0.4	0.1	0.2	0.15	0.15

Encode the text: **ABACABAD** and Decode the Text: **100010111001010**

14. Solve the following instance of Knapsack problem $m=60$, $\{w_1, w_2, w_3, w_4, w_5\} = \{5, 10, 20, 30, 40\}$ $\{p_1, p_2, p_3, p_4, p_5\} = \{30, 20, 100, 90, 160\}$
15. Apply the heapsort for the following list $[9, 7, 1, 8, 3, 6, 2, 4, 10, 5]$ using bottom up approach.
16. Write an algorithm to solve knapsack problem using Greedy technique. Find the optimal solution to the knapsack instance $n=7$, $m=15$, $(P_1, P_2, \dots, P_7) = (10, 5, 15, 7, 6, 18, 3)$, $(W_1, W_2, \dots, W_7) = (2, 3, 5, 7, 1, 4, 1)$